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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
D AGOSTA, STEPHEN M	

ART UNIT	PAPER NUMBER
2683	

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/652,773	JACOBSEN, ERIC A.	
	Examiner	Art Unit	
	Stephen M. D'Agosta	2683	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-5, 8-18, 20-23, 25-29 and 31-33* is/are rejected.

7)☒ Claim(s) *2,6,7,19,24 and 30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 6-14-04 have been fully considered but they are not persuasive.

1. The examiner pointed out objectionable material but the applicant did not amend claims with said material. A more favorable outcome may occur if they applicant amends per the examiner's recommendations.

2. The applicant argues that claim 1 is not taught by the prior art. The examiner disagrees. Daniel teaches positioning an antenna/beam-forming for an antenna array to mitigate interference while Yun teaches power control for an antenna array and Keskitalo teaches using at least one parameter (eg. angle of arrival) for optimal transmission of data. Hence the prior art combines to read on claim 1.

3. The applicant argues that a prima facie case has not been established for claim 1 – the examiner disagrees:

As per claims 1, 16 and 22, 28 and 31, Daniel teaches a system/method for wireless transmission comprising:

- An array of transmit antenna elements (figure 3, #310)
- A direction determination unit (DDU) (figure 3, #340)
- A transmit beamformer to generate a transmit beam in the direction of the remote transceiver (figure 3, #330) (eg. using well known phased array principles as disclosed by the applicant in the specification page 5. L9-18),

But is silent on a power control unit (PCU) to determine antenna gain parameter and adjust transmit power based on antenna gain parameter.

Yun teaches power control (figure 7a, #703 and #71 1 which inherently requires power control hardware) for a communication station with a multiple antenna array (abstract, figures 8a, 9 and C1, L24-50).

It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to modify Daniel, such that power control is supported for a multi-array antenna, to provide control of RF power output for optimal transmission of the RF signal and decrease interference with other transmitters in the area.

Keskitalo teaches an apparatus/method for steering a multi-array antenna signal in such a way that the gain from the antenna array is greatest in a specified direction (abstract, figures 3-9 and C1 , L10 to C2, L65).

It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to modify Daniel in view of Yun, such that wireless transmission for an antenna array with power control also uses antenna array gain parameters to steer the beam in a certain

direction, to provide optimal RF communication based on steering the array, antenna gain and power control parameters.

The claim rejection above shows the converse to be true – in fact the examiner has provided two motivation statements regarding the combination of Daniel, Yun and Keskitalo – 1) use of power control to assist with interference control and 2) using at least one antenna parameter (AOA) to assist with interference control. Since Daniel also "..mitigates interference..." (abstract), the combination is valid and all solve similar problems in the same field of endeavor.

4. The applicant argues that a prima facie case has not been established for claim 14 – the examiner disagrees.

As per claim 14, Daniel in view of Yun and Keskitalo teaches claim 13 but is silent on wherein said common structure is adapted for desktop placement.

Liebendoerfer teaches o achieve space diversity, several antennas can be placed next to one another at a certain distance (for example, a 3-x space diversity antenna system can be built which can be packed into a volume which corresponds to the extension of a PCMCIA card. The antenna is suited preferably for HIPERLAN application and hand radiotelephones (including cordless phones). The antenna is also suited for use in an antenna arrav since the large bandwidth also allows matching in the vicinity of adjacent antennas (C6, L12-30 and figure 4).

It would have been obvious to one of ordiqary skill in the art at the time of applicant's invention to modify Daniel in view of Yun and Keskitalo, such that the common structure is adapted for desktop placement, to provide a small antenna system for use by mobile users.

As seen from the rejection above, Liebendoerfer teaches use of antennas for space diversity in a PCMCIA card for HiPERLAN or cell phones (which is the field of endeavore for Daniel, Yun and Keskitalo). Also, the applicant does not point out WHY one skilled cannot use the prior art in a desktop application (as taught by Liebendoerfer). The examiner asks "where in any of the references does it specifically state that one cannot use an antenna disclosed by the prior art in a desktop application?". The examiner points out that none of the prior art references prevent such an application. Hence the motivation is clear and the combination is valid.

5. The applicant argues that a prima facie case has not been established for claim 17 – the examiner disagrees.

As per claim 17, Daniel in view of Yun and Keskitalo teaches claim 16 but is silent on further comprising a duty cycle unit to determine average transmit duty cycle over a predetermined time and to deliver said average transmit duty cycle information to the PCU to adjust transmit power level of said system.

Roddy teaches a controller that determines the average duty cycle of the desired transmitted signal. The carrier frequency of the intended transmission, which preferably is previously preprogrammed into the controller is then utilized with the determined average duty cycle and the other fixed values and offsets to determine a proper power control signal duty cycle for adjusting the signal strength of the transmitted signal. Determining the necessary characteristics of the power control signal is accomplished, in one example, by utilizing a pre-stored look up table that is programmed into a memory portion of the controller. In another example, mathematical formulas are utilized by the controller to determine the duty cycle of the power control signal based upon the determined signal and circuit factors (C4, L44-62).

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel in view of Yun and Keskitalo, such that a duty cycle unit is used to determine average transmit duty cycle, to provide means for the PCU to adjust transmit power level as needed for optimal wireless transmission/reception.

As seen from the rejection above, Roddy teaches use of average duty cycle for use in power control. The motivation clearly shows that one skilled would use Roddy to assist with power control for optimal wireless transmission/reception as this is the same field of endeavor as the prior art cited. Again, the applicant does not point out WHY one skilled cannot use average duty power calculation to assist with power control (as taught by Liebendoerfer). The examiner asks "where in any of the references does it specifically state that one cannot use Roddy's power control calculations to assist with optimal RF transmission/reception and/or interference mitigation which is taught by the prior art of record?". The examiner (again) points out that none of the prior art references prevent such an application. Hence the motivation is clear and the combination is valid.

6. The rejection below is included for informational purposes only.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-5, 8-13 and 15-16, 18, 20-23, 25-29 *and 31-33* rejected under 35 USC 103(a) as being unpatentable over Daniel et al. U.S. Patent 6,075,484 in view of Yun U.S. Patent 6,463,295 and Keskitalo et al. US 6,345,188 (hereafter referred to as Daniel, Yun and Keskitalo).

As per **claims 1, 16 and 22, 28 and 31**, Daniel teaches a system/method for wireless transmission comprising:

An array of transmit antenna elements (figure 3, #310)

A direction determination unit [DDU] (figure 3, #340)

A transmit beamformer to generate a transmit beam in the direction of the remote transceiver (figure 3, #330) [eg. using well known phased array principles as disclosed by the applicant in the specification page 5, L9-18)]

But is silent on a power control unit (PCU) to determine antenna gain parameter and adjust transmit power based on antenna gain parameter.

Yun teaches power control (figure 7a, #703 and #711 which inherently requires power control hardware) for a communication station with a multiple antenna array (abstract, figures 8a, 9 and C1, L24-50). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to modify Daniel, such that power control is supported for a multi-array antenna, to provide control of RF power output for

optimal transmission of the RF signal and decrease interference with other transmitters in the area.

Keskitalo teaches an apparatus/method for steering a multi-array antenna signal in such a way that the gain from the antenna array is greatest in a specified direction (abstract, figures 3-9 and C1, L10 to C2, L65). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to modify Daniel in view of Yun, such that wireless transmission for an antenna array with power control also uses antenna array gain parameters to steer the beam in a certain direction, to provide optimal RF communication based on steering the array, antenna gain and power control parameters.

As per **claims 3 and 18 and 33**, Daniel in view of Yun and Keskitalo teaches claim 1/16/28 **but is silent on** wherein the PCU adjusts transmit power level to comply with mandated transmit power levels.

Yun teaches power control (figure 7a, #703 and #711 which inherently requires power control hardware) for a communication station with a multiple antenna array (abstract, figures 8a, 9 and C1, L24-50). The examiner interprets the power control hardware as having set limits (ie. minimum and maximum) which reads on the claim.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel in view of Yun and Keskitalo, such that transmit power complies with mandated transmit power levels, to ensure the system stays within regulated/licensed operating limits.

As per **claim 4**, Daniel in view of Yun and Keskitalo teaches claim 1 wherein said array of transmit antenna elements, said direction determination unit and transmit beamformer are each part of an adaptive antenna element (figure 3, #310, #330 and #340 depict this as one system).

As per **claims 5 and 20**, Daniel in view of Yun and Keskitalo teaches claim 1/16 further comprising an array of receive antenna elements that are arranged in a predetermined pattern for use in receiving a signal from the remote transceiver wherein said DDU includes means for analyzing signal portions received by individual antenna elements within said array of receive elements to determine the direction of the remote transceiver (figure 3, two #312 elements are receive antennas and #340 is the DDU].

As per **claim 8**, Daniel in view of Yun and Keskitalo teaches claim 1 and that the DOA information must be precise (C2 , L28-35) and the beamformer implements beam forming and beam steering function necessary to form antenna beam patterns with the desired characteristics (C6, L41-46) [eg. wherein said transmit beam generated by said transmit beamformer is approximately centered in the direction of the remote transceiver determined by said DDU].

As per **claim 9**, Daniel in view of Yun and Keskitalo teaches claim 1 **but is silent on** comprising an input/output interface to couple said system to a data processing device.

Daniel teaches that the DOAE is coupled to the DBF which is coupled to the controller and digital data is exchanged between the DOAE, DBF and controller (C7, L8-16). Daniel also teaches that the DOAE is used to compute various values (C7, L25-32) and that the DOAE comprises one or more parallel processors (C7, L33-42). Hence the examiner interprets any processor as having a data port which an engineer can connect to in order to gather/view data. One skilled in the art would also couple it to a data processing device as well.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel in view of Yun and Keskitalo, such that the system can interface to a data processing device, to provide data to a technician (or user) for viewing on a computer screen or printout.

As per **claim 10, 11 and 12**, Daniel in view of Yun and Keskitalo teaches claim 9 **but is silent on** comprising a serial port, USB port or plug and play capability.

Daniel teaches that the DOAE comprises one or more parallel processors (C7, L33-42). Hence the examiner interprets any processor as having a data port (ie. serial, parallel, USB, LAN, wireless, etc.) which an engineer can connect to in order to gather/view data. One skilled in the art would also expect that said port had plug-and-play capability as is typically available on many/most computer systems today.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel in view of Yun and Keskitalo, such that the system comprises a serial port, USB port or plug-n-play capability, to ensure that it utilizes industry-standard hardware and software which allows it to interoperate with a plethora of other commercially available devices.

As per **claim 13**, Daniel in view of Yun and Keskitalo teaches claim 1 wherein the antenna array, DDU and beamformer are each mounted on a common support structure (figure 1 shows these elements as one system) **but is silent on** and the PCU.

Yun teaches power control (figure 7a, #703 and #711 which inherently requires power control hardware) for a communication station with a multiple antenna array (abstract, figures 8a, 9 and C1, L24-50). The examiner interprets the power control hardware as having set limits (ie. minimum and maximum) which reads on the claim.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel in view of Yun and Keskitalo, such that it contains a PCU, to provide means for the system to control it's transmit power for optimal RF transmission as the environment dictates.

As per **claim 15**, Daniel in view of Yun and Keskitalo teaches claim 1 **but is silent on** a variable gain amplifier.

Variable gain amplifiers are well known in the art and Yun teaches use of different types of amplifiers, ie. first/second intermediate frequency amplifiers, power amplifier and low noise amplifier – figure 1, #115/#123, #175 and #107 respectively).

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel in view of Yun and Keskitalo, such that the system uses a variable gain amplifier, to ensure the RF signal can be variably controlled as dictated by the user's environment.

As per **claim 21**, Daniel in view of Yun and Keskitalo teaches claim 16 and the system appears to be located at a ground station (figure 1, #120, #130, #140, #170, #180) shows the system communicating with a satellite) [eg. perform calculations from a single indoor location]

As per **claim 23,** Daniel in view of Yun and Keskitalo teaches claim 22 **but is silent on** wherein the parameter associated with said transmit beam includes an antenna gain related parameter.

Keskitalo teaches an apparatus/method for steering a multi-array antenna signal in such a way that the gain from the antenna array is greatest in a specified direction (abstract, figures 3-9 and C1, L10 to C2, L65).

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel in view of Yun and Keskitalo, such that an antenna gain related parameter is associated with the transmit beam, to ensure that antenna gain can be a parameter that is modified as needed for optimal RF transmission.

As per **claim 25**, Daniel in view of Yun and Keskitalo teaches claim 22, an array of transmit antenna elements (figure 3, #310) and a transmit beamformer that generates a transmit beam in the direction of the remote transceiver (figure 3, #330) [eg. using phased array techniques].

As per **claim 26 and 32**, Daniel in view of Yun and Keskitalo teaches claim 22/28, wherein said adjustable beamformer is part of an adaptive antenna arrangement (figure 3, #310 and #330).

As per **claim 27**, Daniel in view of Yun and Keskitalo teaches claim 22 **but is silent on** wherein said PCU adjusts the power level of the maximum allowed power is not exceeded.

Yun teaches power control (figure 7a, #703 and #711 which inherently requires power control hardware) for a communication station with a multiple antenna array (abstract, figures 8a, 9 and C1, L24-50). The examiner interprets the power control hardware as having set limits (ie. minimum and maximum) which reads on the claim.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that the PCU controls power level to not exceed maximum allowed, to ensure the system stays within regulated/licensed operating limits.

As per **claim 29**, Daniel in view of Yun and Keskitalo teaches claim 28 and a controller (figure 3, #350) **but is silent on** wherein at least one parameter associated with said transmit beam includes an antenna gain related parameter.

Keskitalo teaches an apparatus/method for steering a multi-array antenna signal in such a way that the gain from the antenna array is greatest in a specified direction (abstract, figures 3-9 and C1, L10 to C2, L65).

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel in view of Yun and Keskitalo, such that the PCU calculates an antenna gain parameter based upon the delay setting, to provide optimal RF transmission to a transceiver based upon its location/direction in view of the antenna beamformer.

Claim 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Daniel/Yun/Keskitalo as applied to claim 13 above, and further in view of Liebendoerfer et al. U.S. Patent 5,943,020 (hereafter referred to as Liebendoerfer).

As per **claim 14**, Daniel in view of Yun and Keskitalo teaches claim 13 **but is silent on** wherein said common structure is adapted for desktop placement.

Liebendoerfer teaches To achieve space diversity, several antennas can be placed next to one another at a certain distance (for example, a 3-x space diversity antenna system can be built which can be packed into a volume which corresponds to

the extension of a PCMCIA card. The antenna is suited preferably for HIPERLAN application and hand radiotelephones (including cordless phones). The antenna is also suited for use in an antenna array since the large bandwidth also allows matching in the vicinity of adjacent antennas (C6, L12-30 and figure 4).

It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to modify Daniel in view of Yun and Keskitalo, such that the common structure is adapted for desktop placement, to provide a small antenna system for use by mobile users.

Claim 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Daniel/Yun/Keskitalo as applied to claim 1 above, and further in view of Roddy et al. U.S. Patent 6,127,740 (hereafter referred to as Roddy).

As per **claim 17**, Daniel in view of Yun and Keskitalo teaches claim 16 **but is silent on** further comprising a duty cycle unit to determine average transmit duty cycle over a predetermined time and to deliver said average transmit duty cycle information to the PCU to adjust transmit power level of said system.

Roddy teaches a controller that determines the average duty cycle of the desired transmitted signal. The carrier frequency of the intended transmission, which preferably is previously preprogrammed into the controller is then utilized with the determined average duty cycle and the other fixed values and offsets to determine a proper power control signal duty cycle for adjusting the signal strength of the transmitted signal. Determining the necessary characteristics of the power control signal is accomplished, in one example, by utilizing a pre-stored look up table that is programmed into a memory portion of the controller. In another example, mathematical formulas are utilized by the controller to determine the duty cycle of the power control signal based upon the determined signal and circuit factors (C4, L44-62).

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel in view of Yun and Keskitalo, such that a duty cycle unit is used to determine average transmit duty cycle, to provide means for the PCU to adjust transmit power level as needed for optimal wireless transmission/reception.

Allowable Subject Matter

Claims 2, 6-7, 19, 24 and 30 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 2, 24 and 30 – prior art cited does not disclose a duty cycle unit that determines average duty cycle used by power control unit based on the detailed independent claims to which they depend.

Claim 6 – prior art cited does not disclose a variable delay unit for each antenna unit and controller that sets variable delay based upon direction.

Claim 7 (depends on claim 6).

Claim 19 – prior art does not teach using antenna parameter to not exceed power control (especially when taking into account claims 18 and 16).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. D'Agosta whose telephone number is 703-306-5426. The examiner can normally be reached on M-F, 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Trost can be reached on 703-308-5318. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SMD 9-28-04

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